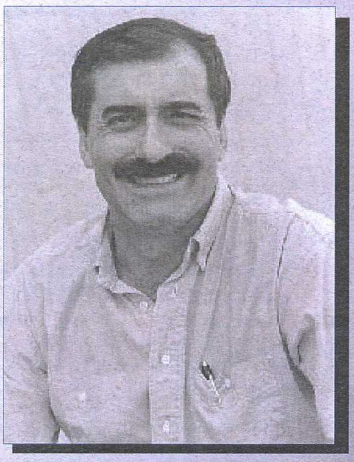
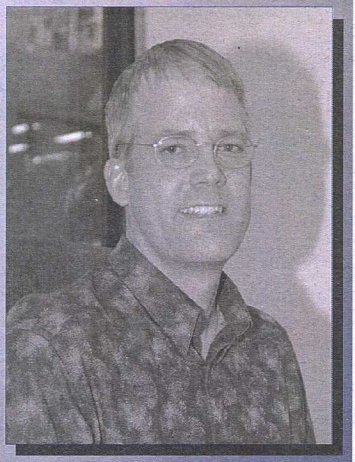
IMSA Great Minds Program®



Dr. Edward W. Kolb



Dr. Joseph D. Lykken

Illinois Mathematics and Science Academy
IMSA Great Minds Program® presents

"The Quantum and the Cosmos"

Wednesday, March 17, 2004
9:30 a.m. IMSA Auditorium

IMSA®

Dr. Edward Kolb and Dr. Joseph Lykken
GUEST SPEAKERS

Dr. Edward W. Kolb

Edward W. Kolb (known to most as *Rocky*) is the founding head of the NASA/Fermilab Astrophysics Group at Fermi National Accelerator Laboratory. He is also a Professor of Astronomy and Astrophysics at The University of Chicago.

A native of New Orleans, he received a Ph.D. in physics from the University of Texas. Postdoctoral research was performed at the California Institute of Technology and Los Alamos National Laboratory where he was the J. Robert Oppenheimer Research Fellow. He is a Fellow of the American Physical Society. Rocky has served on editorial boards of several international scientific journals as well as *Astronomy* magazine.

The field of Rocky's research is the application of elementary-particle physics to the very early Universe. In addition to over 200 scientific papers, he is a co-author of *The Early Universe*, the standard textbook on particle physics and cosmology. His new book for the general public, *Blind Watchers of the Sky* (winner of the 1996 Emme award from the AAS) is the story of the people and ideas that shaped our view of the universe.

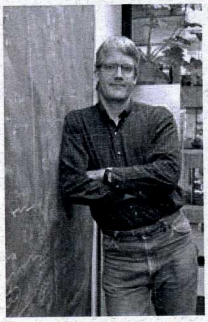
He has been selected by the American Physical Society and the International Conference on High-Energy Physics to present public lectures in conjunction with international physics meetings. Rocky has appeared in several television productions, most recently in a BBC special on cosmology. He can also be seen in the OMNIMAX/MAX film, *The Cosmic Voyage*.

Dr. Joseph D. Lykken

Joe Lykken is a theoretical particle physicist at the Fermi National Accelerator Laboratory, and a professor in the Physics Department and Enrico Fermi Institute at the University of Chicago.

After receiving his Ph.D. from M.I.T. in 1982, he migrated to the University of Texas, where he worked with Steven Weinberg on the first realistic theoretical models of supersymmetry. In 1984 he joined the stampede of particle theorists into superstring theory, and spent the next decade wrestling with deep issues of how strings are related both to quantum gravity and to particle physics.

In a 1996 paper he was the first to suggest that superstrings and quantum gravity might appear directly in the next generation of particle physics experiments. He also co-authored two of the early papers on the physics of large or warped extra dimensions.



Since joining the theory group at Fermilab in 1989, he has been involved in planning experimental searches for supersymmetry, the Higgs boson, and for extra dimensions. He has served and continues to serve on number of special panels and committees charged with shaping the future of particle physics. He is a fellow of the American Physical Society and is the Scientific Secretary of the Aspen Center for Physics. He was featured on the NOVA television series, "The Elegant Universe," where he explained the nature and meaning of string theory, dark matter, super particles and extra dimensions.

Our Moderator for this IMSA Great Minds Program® Event:

Dr. Olga Mena

Dr. Olga Mena was born in Madrid, and received a Ph.D. in physics from Madrid's Auto'noma University in 2003. Presently she is a postdoctoral fellow in the Theoretical Particle Physics Group at Fermi National Accelerator Laboratory.

As a theoretical physicist, she works in the very exciting area of neutrino physics. In particular, she is interested in what we can learn about the properties of the elusive neutrino from "long-baseline" experiments, where neutrinos are produced at a laboratory like Fermilab, pass underground through Earth, and are seen in detectors hundreds of miles away.

As a particle physicist, Dr. Mena thinks it is important to look for a theoretical model to explain present and forthcoming neutrino experiments. She believes a theoretical model of neutrinos will illuminate the way to the discovery of a Unified Theory of all interactions.

"The Quantum and the Cosmos"

9:30 a.m.	Welcome and Introductions IMSA President, Stephanie Marshall, PhD.
	Remarks Dr. Edward Kolb and Dr. Joseph Lykken
	Moderated Discussion
	Questions and Answers
10:45 a.m.	Break
11:00 a.m.	Break-out Sessions
	Auditorium: Dr. Kolb "Dark Matter, Dark Energy"
	Horwitz Room: Dr. Mena "Neutrinos"
	Academic Pit: Dr. Lykken "String Theory"
11:30 a.m.	End

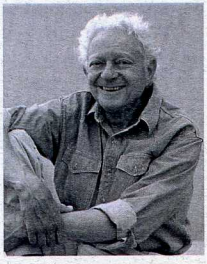
Join us for the next IMSA Great Minds Program® Event:

"How to win the Nobel Prize: or, why would you want to?"

Leon Lederman, internationally renowned specialist in high-energy physics, is director emeritus of Fermi National Accelerator laboratory in Batavia, Illinois, and was the Eugene Higgins Professor at Columbia University. He has been associated with Columbia as a student and faculty member for more than thirty hears; he was director of Nevis Laboratories, which was the Columbia physics department center for experimental research in high-energy physics from 1961 until 1979. With colleagues and students from Nevis, he led an intensive and wide-ranging series of experiments, which provided major advances in particle physics. His publication list runs to over 300 papers. Lederman was the director of Fermi National Accelerator Laboratory from 1979 to 1989. Since 1998, he holds the position of Resident Scholar at the Illinois Mathematics and Science Academy and since 1993, Pritzker Professor of Science at the Illinois Institute of Technology in Chicago.

Lederman has also worked tirelessly to improve science education. He was instrumental in founding the Illinois Mathematics and Science Academy (IMSA), a residential high school for the gifted, and the Teachers Academy for Math and Science (TAMS), which provides professional development for primary school teachers in Chicago. The "hands-on" pedagogue has been applied in France, Brazil, China and Malaysia, mainly through the agency of the Committee on Capacity Building in Science. Lederman chaired this Committee of International Council for Science from 1994-2000. The Lederman Science Center, a hands-on science museum, where visitors can explore the physics and technology of Fermilab, was also born as a result of his efforts. "Saturday Morning Physics" (a short-course for high school students) was initiated by Lederman in 1980. He has been an outspoken advocate for new approaches to secondary science that emphasize a coherent three-year science curriculum beginning with physics. There are a growing number of schools introducing the new curricula inspired by his advocacy.

He has been a member of College Board task forces, in Minority High Achievement (1998), and on the Future of Advanced Placement (2000). Currently, he is a member of the National Commission on the High School Senior Year.



Date: Wednesday, May 5, 2004
Time: 1:00 p.m.
Where: Illinois Mathematics and Science Academy® Auditorium
Autographs and reception following presentation

IMSA Great Minds Program® provides opportunities for Illinois educators, students and the general public to learn from and interact with 'great minds' of our times including Nobel Laureates and other thought leaders in mathematics, science, the arts and humanities. Today's event is part of the Tellabs Great Minds Dialogue and Community Lecture Series and is supported, in part, through a generous grant from the Tellabs Foundation, established by Tellabs, Inc., a global communications equipment manufacturer based in Naperville, Illinois. Please visit IMSA's website for more information on Great Minds Program Events: **www.imsa.edu**

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